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ASPHONDYLIA DODONAEAE, A NEW SPECIES OF CECIDOMYIIDAE (DIPTERA) DAMAGING LEAVES AND BRANCHES OF HOP-BUSH, *DODONAEA VISCOSA* (SAPINDACEAE) IN AUSTRALIA.

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Summary

KOLESIK, P. (1995) *Asphondylia dodonaeae*, a new species of Cecidomyiidae (Diptera) damaging leaves and branches of hop-bush, *Dodonaea viscosa* (Sapindaceae) in Australia. *Trans. R. Soc. S. Aust.* **119**(4), 171-176, 30 November, 1995.

A new gall midge species *Asphondylia dodonaeae*, is described from South Australia. Detailed descriptions of the larva, pupa, male and female as well as the infestation symptoms on leaves and branches of hop-bush, *Dodonaea viscosa* Jacq. subsp. *spathulata* (Smith) J. G. West (Sapindaceae), are given. The new species is diagnosed and compared to other species of the genus *Asphondylia*.

KEY WORDS: Cecidomyiidae, *Asphondylia dodonaeae* sp. nov., *Dodonaea viscosa*, South Australia.

Introduction

The new gall midge species described here was found infesting leaves and terminal branches of hop-bush, *Dodonaea viscosa* Jacq. subsp. *spathulata* (Smith) J. G. West (Sapindaceae) in South Australia.

Dodonaea viscosa Jacq. is a shrub or tree up to 8 m tall. It occurs throughout Australia and extends into tropical Asia, America and Africa and into temperate southern Africa, New Zealand and Pacific islands (Reynolds & West 1985). Its leaves are used in various parts of the world in folk medicine to control fever, colic, inflammation, swellings, rheumatism and pain (West 1984; Ahmad *et al.* 1987; Wagner *et al.* 1987; Mata *et al.* 1991). In several countries it is used as firewood, material for tool handles and for reclamation of unused or degraded landscape areas such as sand dunes, marshlands and mine wastes (Norem *et al.* 1982; Reynolds & West 1985). In Australia a purple-leaved form is grown widely in gardens and the foliage is valued for its decorative appearance.

The hop-bush is a common shrub in remnants of the original flora around Adelaide where it forms a substantial part of the medium-high vegetation cover in the nature conservation parks. During 1992-1993 large numbers of galls were found on almost all shrubs surveyed in Morialta and Cleland Conservation parks. The new gall midge appears to have two generations in the Adelaide area, the first from January to February, the second from September to October. Shrubs bearing galls from two successive generations of the gall midge can often be found.

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Materials and Methods

Leaf and branch stem galls of *Dodonaea viscosa* subsp. *spathulata* were sampled in Morialta (27.xi.1992 and 26.ix.1993) and Cleland Conservation Parks (3.i.1993). The parks are adjacent and located about 13 km north-east of Adelaide. The galls obtained on 26.ix.1993 were processed in two ways. A small number was dissected and the larvae (along with one larva from 27.xi.1992) and pupae were preserved in 70% ethanol after notes were made on their colour. A larger number, with larvae and pupae retained within galls, was brought to the laboratory to rear to adults. Branches with galls were kept in plastic bags. Larvae pupated in their galls. Plastic bags were examined daily and emerged adults preserved together with their pupal skins in 70% ethanol after their colour had been noted. Canada balsam mounts of a series for microscopic examination were prepared according to the technique outlined by Kolesik (1995). The type series and other materials retained in 70% ethanol together with dried examples of the galls are deposited in the South Australian Museum, Adelaide [SAM], Australian National Insect Collection, CSIRO, Canberra [ANIC] and United States National Museum [USNM], Washington DC USA.

Asphondylia dodonaeae sp. nov.
(FIGS 1-19)

Holotype: ♂, Morialta Conservation Park, South Australia [34°54′S, 138°44′E], 29.ix.1993, P. Kolesik, reared from larva from leaf gall of *Dodonaea viscosa* Jacq. subsp. *spathulata* (Smith) J. G. West, sampled 26.ix.1993, 121272 [SAM].

Allotype: ♀, same data, I21273 [SAM].

Paratypes: 3♂♂, 3♀♀, 4 larvae, 4 pupal skins [SAM]; 2♂♂, 2♀♀, 2 larvae, 2 pupal skins [ANIC]; all same data; 1 larva, sampled 27.xi.1992 [SAM].

Other material: 10♂♂, 10♀♀ [SAM], 5♂♂, 5♀♀, [USNM], 10 pupal skins [SAM], 5 pupal skins [USNM], 10 pupae, all same data as holotype, 5 larvae [SAM], 5 larvae [USNM], all collected with holotype.

Diagnosis

Wings with R_5 joining C at wing apex, Rs absent, R_1 joining C at wing mid-length, M_{1+2} absent, M_1 weakly developed, Cu forked, Sc cell opaque. Flagellomeres 12 in number, cylindrical with short necks, first and second not fused, with short and stout setae and bearing anastomosing slightly appressed circumfila. Male flagellomeres all about same length, female ones, especially the apical three, successively and progressively shorter. Tarsus: first segment substantially shorter than second, bearing ventroapical spine; claws simple; empodia longer than claws. Male terminalia: gonocoxites free ventrally, short, with small apical lobe; gonostylus situated dorsally on gonocoxite, short, bearing two teeth merged basally; hypoproct and cerci bilobate; aedeagus long, stout, tapering distally. Female abdominal sternite 7 about three times longer than sternite 6. Ovipositor: elongate, sclerotized, with large basal lobes; cerci fused, glabrous, bearing few microsetae.

Male (Figs 1-7)

Colour: sclerotized parts of body dark brown, setae and scales black, non-sclerotized parts of abdomen orange. Wing length 2.4 mm (range 2.2 - 2.6), width 1.1 mm (1.0 - 1.2). Wing membrane and veins densely covered with setae, 55 - 120 μm, microtrichia dense, about 0.5 μm long. Flagellomeres with stout setae, 33-38 μm, more or less equally positioned on the segments. Circumfila: two long and two short longitudinal bands with long bands connected to each other by transverse circular bands on both ends; each of the short bands attached on both ends to one of the long ones by short transverse arch; the transverse circular bands on the distal end of the flagellomere arched strongly. Eye facets rounded, eye bridge 8-9 facets long. Maxillary palpus 3 or 4 segmented, often specimens with different number of segments in left and right maxillary palpus can be found; however, total length of both palpi about the same. Palpiger weakly developed. Legs covered with setae and scales, the latter serrated at distal end.

Female (Figs 8-12)

Wing length 2.6 mm (2.6 – 2.7), width 1.2 mm (1.2-1.3). Flagellomeres with stout setae, 30 – 35 μm. Circumfila comprising two transverse bands connected by two short longitudinal bands. Claws somewhat stronger than in male. Abdominal sternite seven 3.2 times (3.1 - 3.3) longer than sternite six. Setae of cerci 6 - 8 in number and less than 1 μm in length. Other characters as in male.

Mature larva (Figs 13-15)

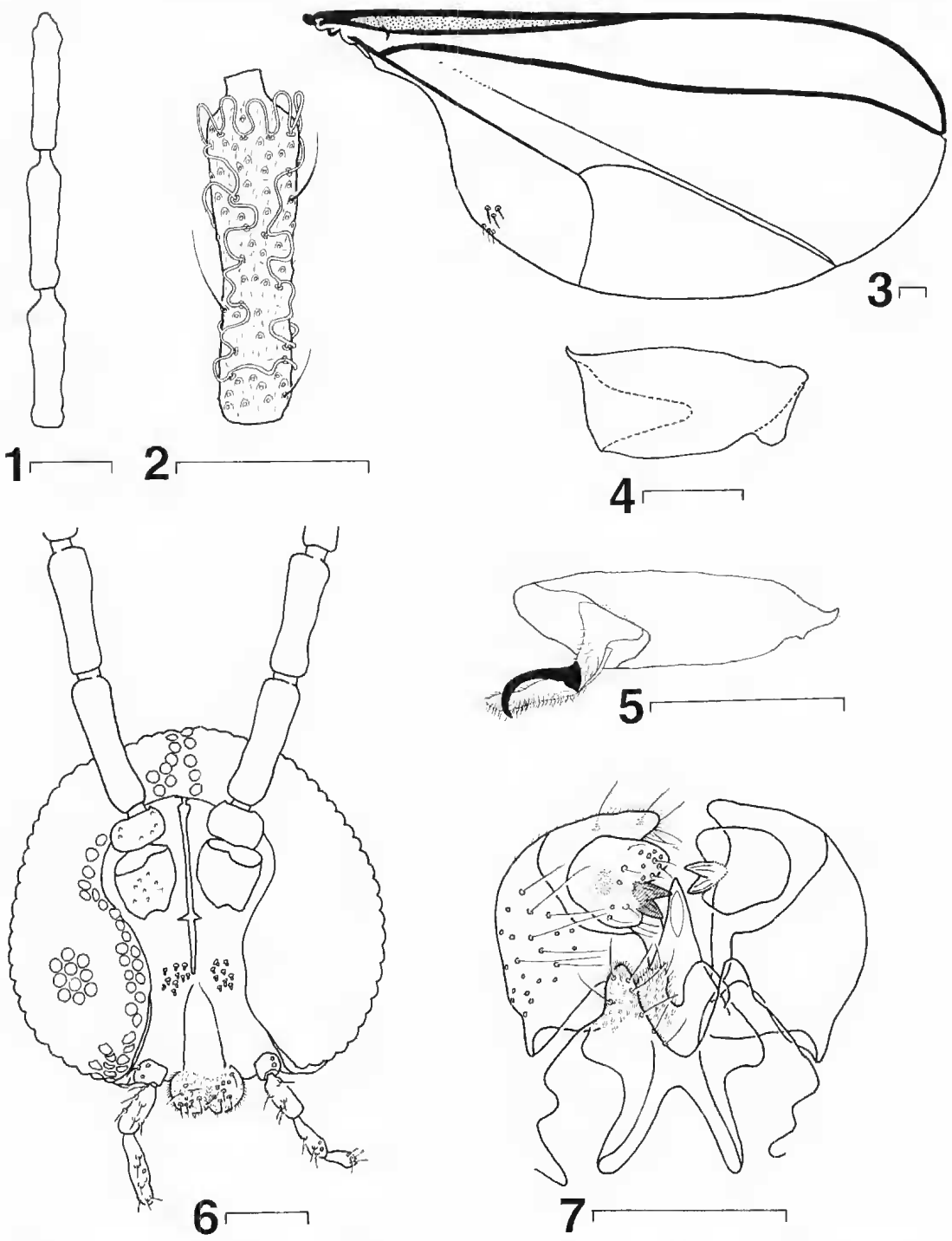
Colour pale orange. Total length 1.9 mm (1.7 - 2.2). Head capsule width 91 μm (90 - 92), length 29 μm (26-31), length of posterolateral extensions 10 μm (9 - 10). Antenna 14 μm (13 - 15). Sternal spatula bilobate, 111 μm (108 - 116) in length, with apical enlargement 68 μm (64 - 74) in width and incision 34 μm (31 - 38) in depth. Area around spatula not sclerotized. Anus dorsal. One pair of sternal papillae on thoracic and first to seventh abdominal segments. One pair of ventral papillae on collar, second and third thoracic and first to eighth abdominal segments. Two pairs of lateral papillae on thoracic segments. Pleural papillae: first and third thoracic and first to eighth abdominal segments with one pair, second thoracic segment with two pairs. Dorsal papillae: collar, third thoracic and last two abdominal segments with one pair, first two thoracic and first to seventh abdominal segments with two pairs. The setae on lateral papillae 3 - 5 μm long, those on other papillae 4 - 20 μm long.

Pupa (Figs 16-18)

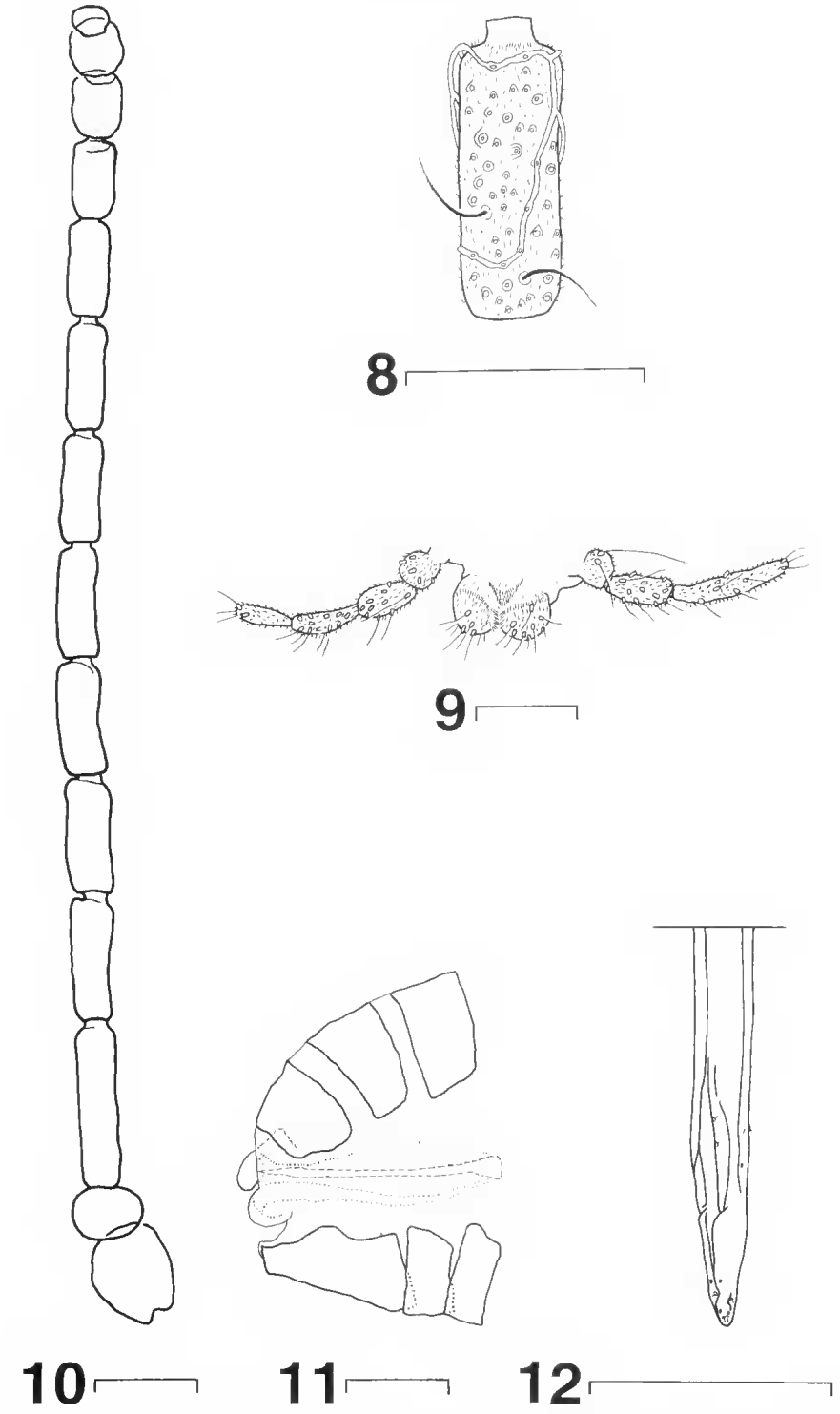
Colour: antennal horns, prothoracic spiracles and dorsal spines dark brown, remaining parts pale brown. Total length 3.0 mm (2.7 – 3.2). Antennal horns triangular, serrated, 161 μm (147 - 182) in length. Cephalic papillae with seta 39 μm (36 - 44). Upper and lower frontal horns absent. Two pairs of lower facial papillae, each consisting of one setose (5 - 15 μm) and one asetose papilla. Two triplets of lateral facial papillae, each consisting of two setose (about 2 μm) papillae and one asetose papilla. Prothoracic horn with trachea ending at its mid-length, 96 μm (83-103) long. Second to eighth abdominal segments with two pairs of dorsal papillae (length of setae 8 - 13 μm), two pairs of pleural papillae (19 - 31 μm) and one pair of ventral papillae (12 - 14 μm). Dorsal spines simple, 46 - 104 in number and 8 - 41 μm in length, with length and number increasing from second to ninth segments.

Gall (Fig. 19)

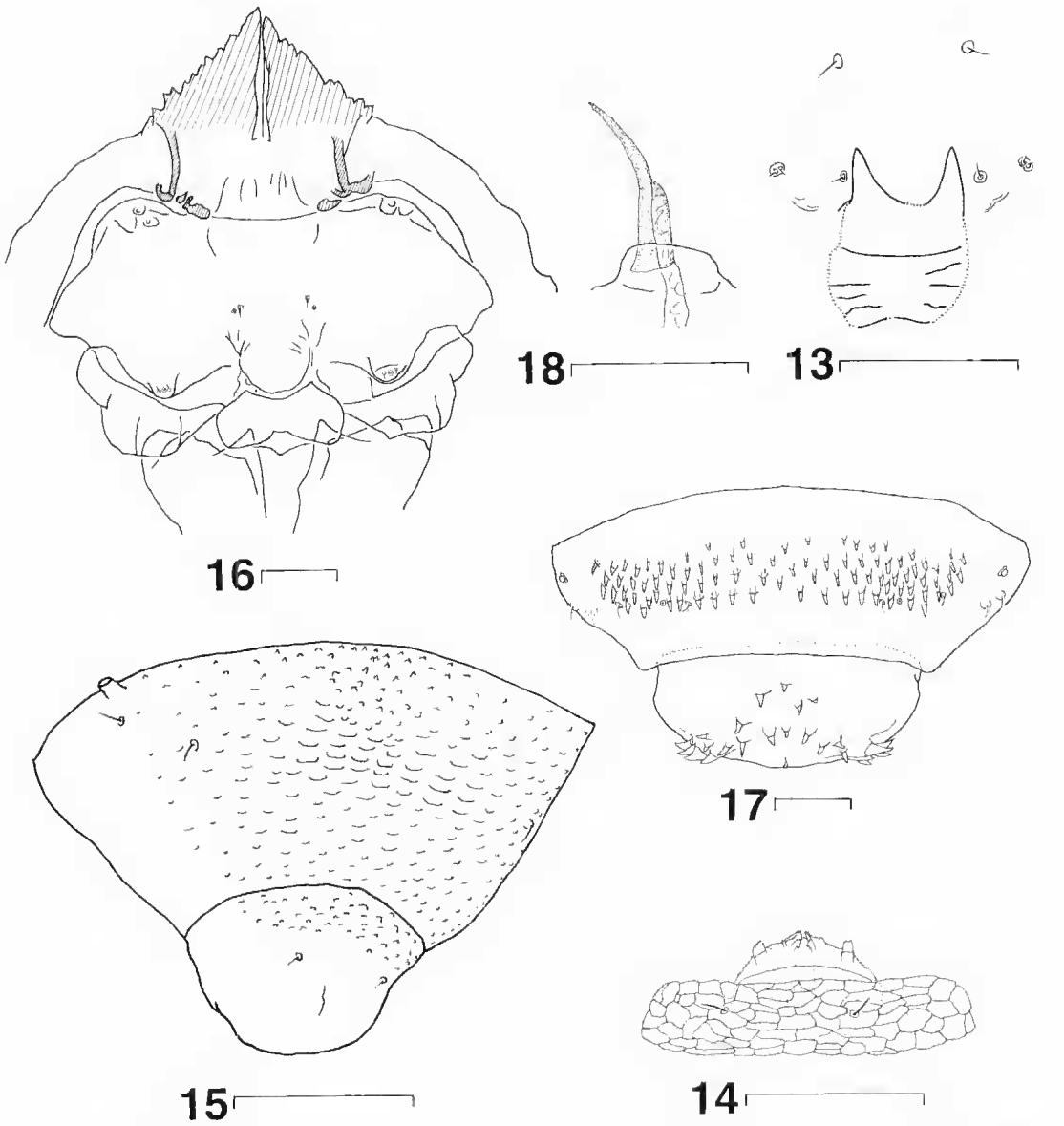
This species forms subglobular monothalamous galls on terminal branch stems and leaf main veins, glabrous, 4 mm long and 3 mm in diameter, green in colour. One larva occupies each gall. Pupation takes place inside the gall. Circular necrotized tissue area, brown in colour, appears on the top of the gall before the pupa cuts a circular opening with its antennal horns by moving its body up and down. The lid to this opening remains attached to the gall by a thin strip of uncut tissue. The pupa raises two thirds of its body outside the gall shortly before emergence as adult. On 24



Figs 1-7. Male of *Asphondylia dodonaeae* sp. nov. 1. Last three flagellomeres. 2. Sixth flagellomere. 3. Wing. 4. First tarsomere. 5. Last tarsomere with claw and empodium. 6. Head in frontal view. 7. Genitalia in dorsal view. Scale bars = 100 μm.



Figs 8-12. Female of *Asphondylia dodonaeae* sp. nov. 8. Sixth flagellomere. 9. Mouth parts in frontal view. 10. Antenna. 11. End of abdomen in lateral view. 12. End of ovipositor in ventro-lateral view. Scale bars = 100 μm.



Figs 13-18. *Asphondylia dodonaeae* sp. nov. 13-15 larva. 16-18 pupa. 13. Sternal spatula. 14. Head capsule and collar segment in dorsal view. 15. Last two abdominal segments in dorso-lateral view. 16. Anterior part in ventral view. 17. Last two abdominal segments in dorsal view. 18. Prothoracic spiracle. Scale bars = 100 μm.

Fig. 19. Galls of *Asphondylia dodonaeae* sp. nov. on *Dodonaea viscosa* Jacq. subsp. *spathulata* (Smith) J. G. West. Scale bar = 2 cm.

November 1992, the vast majority of the galls were dried, only a few of them still contained larvae. On 3 January 1993, the galls were fresh and contained immature larvae. On 26 September 1993, most of the galls were occupied by pupae, with a few occupied by larvae and a few already empty. Empty galls retained pupal skins in openings. On each of the latter occasions a few dried galls from the previous generation were present on the shrubs. The species seems to have two generations in the area surveyed – adults of the first generation appear possibly from January to February and those of the second generation from September to October.

Etymology

The species name is derived from the generic name of the host plant.

Remarks

The new species can be assigned to the genus *Asphondylia* because the female seventh abdominal sternite is more than 1.5 times longer than the sixth, the male genitalia have a ventroapical gonocoxal lobe and dorsally situated gonostylus that is about as broad as long, combined with the first tarsomeres having a ventrodistal spine, the gonostylus bearing two basally merged teeth and the ovipositor having large basal lobes (Gagné 1994). Within the genus *Asphondylia* it is distinguished from other species by lacking both upper and lower frontal horns in the pupa.

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